

Appendix 4.2**Default Subsurface Soil Petroleum
Characterization for Sites Regulated Under
IC 13-11 and 329 IAC 9****Introduction**

The RISC guidance includes a specific two-step procedure for screening and determining the extent of contamination within subsurface soil at petroleum release sites. This procedure constitutes a combined approach for screening and characterizing subsurface soil. Surface soil and ground water screening may still be necessary for petroleum release sites. Procedures for screening are the same as for chemical release sites.

Borings should be performed as outlined in [Chapter 3](#) of the RISC Technical Guide. If an unbreached, dense, and relatively low-permeability stratigraphic unit is present beneath the source area, a shallower investigation may be warranted. Highly permeable conditions may warrant a deeper investigation. For the purposes of evaluating the migration to ground water pathway, samples should not be collected from the smear zone.

Ground water screening should be conducted in accordance with the default guidance presented in Section 3.4.5 of the RISC Technical Guide.

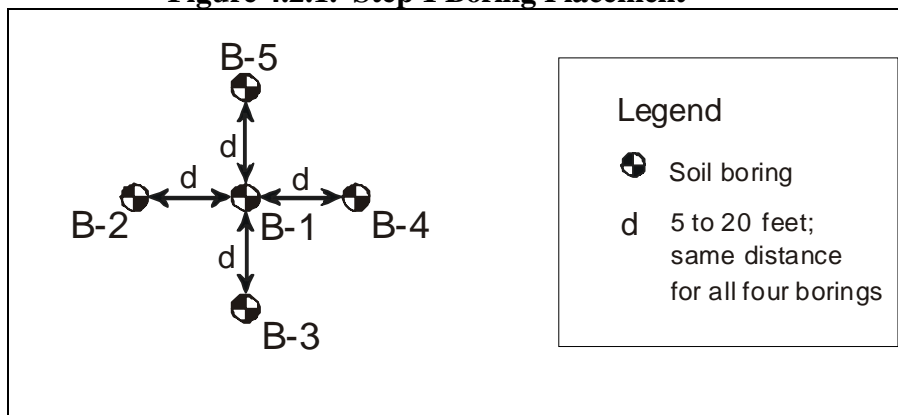
Step 1

Step 1 consists of advancing five borings in the immediate area of the release. For small releases, this procedure may define the outer limits of the source area. One boring should be located at the spot expected to be the most contaminated (the center boring) based on surface soil screening results or other information obtained during presampling activities. Four borings should be placed at a uniform distance from the center boring (5 to 20 feet out) in each of the four general directions at perpendicular axes (see Figure 4.2-1). In areas where it may be impractical to use perpendicular axes, random orientation of the axes is acceptable.

If chemical of concern (COC) concentrations from all five borings are below the residential default closure levels, characterization is complete and subsurface soil does not require remediation. If the COC concentrations in the four outer borings are below these default levels but the concentration in the center boring is above, a potential exposure concentration (PEC) should be calculated as the mean of the concentrations in all five borings plus one standard deviation. The standard deviation is calculated using the soil boring COC

concentration data as a sample of the population of available data. Because the source size in this scenario is less than 0.25 acre, the PEC should be compared to the 0.25-acre default closure level for the appropriate land-use category. If the PEC is less than the closure level, characterization is complete.

Figure 4.2.1. Step 1 Boring Placement



Step 2

If Step 1 did not indicate that soil COC concentrations in the four outer borings are at or below the residential default closure levels, the investigation proceeds to Step 2. Step 2 is a comparison value calculation based on results from regularly spaced borings along two intersecting lines that traverse the extent of the release.

The Step 2 investigation consists of placing additional borings outward from the center boring in each direction where the residential default closure levels were exceeded. These borings should be continuously placed 5 to 20 feet from each other along the axis until soil COC concentrations are at or below the closure levels for the COCs. Allowance can be made for above- or underground obstacles, but the distances between all borings along the two lines should be as close to the same as possible. Figure 4.2-2 illustrates an example of the Step 2 boring strategy

Once the extent of contamination in all four directions has been determined, the PEC can be calculated using data from all of the borings along all transects where Step 2 sampling was conducted. Samples below the EQL are calculated as $\frac{1}{2}$ the EQL. As noted above, the PEC is the mean of the soil COC concentrations from all borings plus one standard deviation calculated using the concentrations as a sample of the population of available data.

The source size should be calculated by squaring the length of the longest transect. Source size categories are less than 0.25 acre and 0.25 to 0.5 acre. The PEC should be compared to the appropriate source size and land use-specific closure level in [Tables 4.1-1 and 4.1-2](#) in Appendix 4.1. If the PEC is less than the appropriate default closure level, characterization is complete. If the PEC exceeds the default closure level, the site can be remediated to the default closure levels or a nondefault risk assessment can be conducted.

Figure 4.2-3 presents a flow chart describing the decision-making process involved in characterizing subsurface soil.

Figure 4.2.2: Step 2 Boring Placement

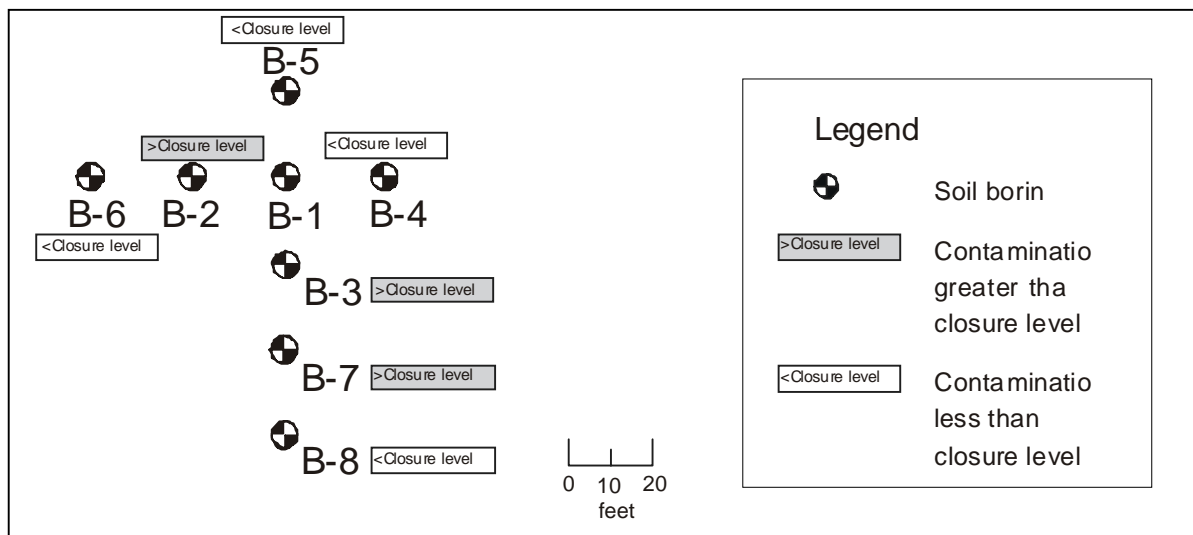


Figure 4.2-3. Flow Chart of Decision-Making Process for Petroleum Releases

